# Preliminary Documentation of RAV-Associated Tornado-Shaped Streaked Filament Morphology

A priority-oriented observational abstract describing recurrent curved and helical-appearing luminous filament structures in a high-voltage quartz-tube discharge

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| **Researcher / originator** | Shawn Jason Calderon |
| **Proposed morphology term** | Calderon Streaked Filament Morphology (CSFM) |
| **Related working term** | RAV (researcher's designation for the localized recurring discharge structure) |
| **Primary video record** | IMG_8552.MOV |
| **Video record verified** | 3840 x 2160 UHD, HEVC 10-bit, 120 fps, 5.5117 s, 102,272,338 bytes |
| **Disclosure date** | August 9, 2026 |
| **Document status** | Preliminary observational disclosure; not peer reviewed |

## Abstract

This disclosure documents a recurrent luminous filament morphology observed by Shawn Jason Calderon during high-voltage direct-current plasma experiments involving a vertically oriented quartz/glass tube. The morphology is provisionally designated **Calderon Streaked Filament Morphology (CSFM)**. In the recorded experiment, a localized bright discharge structure, referred to by the researcher as a **RAV**, forms in association with the tube while fine luminous streaks and filament bundles develop around and adjacent to the localized discharge region. The primary record examined here, IMG_8552.MOV, was preserved at 3840 x 2160 resolution and 120 frames per second. Frame-to-frame inspection shows that the discharge is not limited to a single stationary straight arc. Instead, luminous filaments repeatedly bend away from the tube, contract toward it, and reorganize into curved, nested, and locally parallel paths. During portions of the sequence, these paths outline partial oval, corkscrew-like, or tapered tornado-like envelopes. The recurrence of similarly organized curved streaks over multiple successive frames distinguishes the observation from a claim based on one isolated still image.

The current evidence supports a conservative description of the phenomenon as a **recurrent, spatially organized, streaked discharge morphology whose two-dimensional projection is consistent with portions of a helical or vortex-shaped envelope**. The recording alone does not establish that the plasma undergoes true three-dimensional bulk rotation, nor does it by itself establish a new plasma state or mechanism. Rapid streamer relocation, electrohydrodynamic effects, surface charging, space-charge evolution, dielectric interactions, exposure behavior, and projection geometry remain alternative or contributing explanations that require controlled testing. Optical ghosts or lens-flare spots displaced from the active discharge are excluded from the morphology classification. The physically relevant CSFM features are the luminous filamentary structures spatially associated with the quartz-tube discharge.

The purpose of this document is therefore twofold: first, to establish a dated technical description and nomenclature for the observed morphology; and second, to define testable criteria for determining whether the apparent tornado-like structures represent reproducible rotating plasma/streamer dynamics or another known discharge process. Future work should use tightly cropped 120-fps or faster sequences, fixed camera and exposure settings, multiple viewing angles or synchronized cameras, polarity and voltage controls, particle/streak trajectory tracking, and repeat trials with and without introduced carbon material. Demonstration of coherent angular progression around a stable axis, especially when independently observed from multiple viewpoints, would provide substantially stronger evidence for a physical vortex interpretation. Until those tests are completed, CSFM is presented as a proposed descriptive morphology and not as a claim of a proven new physical mechanism.

## Experimental Context

The experiment belongs to a continuing series of high-voltage RAV/CSFM observations. In the configuration associated with the present video, the researcher reports approximately 60 kV DC at a nominal 10 mA supply rating, with the electric discharge interacting with a vertically oriented quartz/glass tube. A very small quantity of carbon crystals is used as a visible tracer/participant in selected experiments. The working observation is that luminous streaks become visible around the localized RAV region and can trace rapidly changing curved structures that resemble small tornadoes or helices when viewed in high-speed video. Supply ratings describe the source capability and should not be interpreted as a direct measurement of instantaneous current through an individual luminous filament.

## Observed Morphological Features in IMG_8552.MOV

• **Localized persistence:** a bright discharge region remains associated with approximately the same experimental volume while its internal and adjacent filament geometry changes rapidly.

• **Curved filament bundles:** multiple luminous paths exhibit pronounced curvature rather than remaining as a single straight channel.

• **Nested / approximately parallel streaks:** portions of the sequence contain neighboring curved filaments that collectively suggest the sidewall of an organized envelope.

• **Tornado- or helix-like projection:** selected intervals show partial oval or corkscrew-like contours, sometimes narrowing or widening along the apparent axis.

• **Temporal recurrence:** related curved geometries recur across successive 120-fps frames rather than appearing only as one anomalous exposure.

• **Dynamic reorganization:** the discharge expands, contracts, branches, and redirects while retaining a recurring association with the tube/RAV region.

## Proposed Descriptive Definition

> **Calderon Streaked Filament Morphology (CSFM): a proposed descriptive term for a high-voltage discharge morphology in which fine luminous streaks or filament bundles repeatedly form organized curved, nested, helical-appearing, toroidal-appearing, or vortex-envelope patterns in spatial association with a localized RAV discharge structure. The term describes observed geometry and temporal organization; it does not, by definition, assert the underlying mechanism or prove bulk plasma rotation.**

## Scientific Interpretation and Evidentiary Boundary

A two-dimensional high-speed recording can establish the existence, persistence, recurrence, and projected geometry of luminous structures. It cannot alone determine the complete three-dimensional velocity field. Accordingly, the strongest statement supported by the present record is that organized curved streaks repeatedly form a projected geometry consistent with parts of a helical or vortex-shaped discharge envelope. A stronger claim - that individual plasma elements physically rotate around a common axis - requires trajectory evidence that cannot be reproduced by ordinary streamer wandering, sequential breakdown paths, or projection effects.

## Suggested Falsifiable Tests

• **Frame tracking:** track identifiable filament features over 60-120 consecutive native frames and test for consistent angular progression around a stable axis.

• **Stereo observation:** record the same event simultaneously from two approximately orthogonal viewpoints. A true three-dimensional helix should produce mutually consistent projected trajectories.

• **Repeatability:** reproduce the morphology across independent runs while recording voltage, polarity, electrode spacing, tube geometry, humidity, pressure, and carbon quantity.

• **Tracer control:** compare otherwise matched runs with and without carbon crystals to determine whether the carbon reveals an existing flow, materially changes the discharge, or both.

• **Exposure control:** lock focus, exposure, frame rate, shutter behavior, and camera position so that streak geometry can be separated from motion blur, auto-exposure, rolling-shutter, and computational imaging effects.

• **Field/geometric controls:** systematically vary tube diameter, dielectric material, electrode placement, and polarity to identify which boundary conditions generate or suppress the morphology.

## Priority and Attribution Statement

This document records that, as of August 9, 2026, Shawn Jason Calderon was using the term **Calderon Streaked Filament Morphology (CSFM)** for the recurrent streaked filament structures described above and was investigating their relationship to the localized discharge structures he designates as RAVs. The associated native high-speed video identified here as IMG_8552.MOV is part of the observational record. Publication of this PDF and the associated original media in a timestamped public repository can provide useful evidence of what was publicly disclosed and when.

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## Recommended Archive Package

For preservation and later verification, archive this PDF together with the original, unedited IMG_8552.MOV file; a short README describing the apparatus and recording conditions; representative lossless frame exports; and, when available, later repeat trials. Preserve original filenames and original media metadata whenever possible. Do not replace the native video with a social-media or messaging-app transcode.

## Keywords

high-voltage plasma; electrical discharge; streamer; filament; vortex morphology; helical discharge; tornado-shaped plasma; quartz dielectric; carbon tracer; RAV; Calderon Streaked Filament Morphology; CSFM; high-speed imaging; 120 fps

Prepared as a preliminary research disclosure from the observational record available on August 9, 2026. Terminology is provisional and may be refined as controlled experiments and literature comparison proceed.